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Research article

Developing a framework for evaluating the impact of Healthcare Improvement Science Education across Europe: a qualitative study

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Abstract

Purpose: Frontline healthcare professionals are well positioned to improve the systems in which they work. Educational curricula, however, have not always equipped healthcare professionals with the skills or knowledge to

implement and evaluate improvements. It is important to have a robust and standardized framework in order to evaluate the impact of such education in terms of improvement, both within and across European countries. The results of such evaluations will enhance the further development and delivery of Healthcare Improvement Science (HIS) education. We aimed at describing the development and piloting of a framework for prospectively evaluating the impact of HIS education and learning.

Methods: The evaluation framework was designed collaboratively and piloted in 7 European countries following a qualitative methodology. It used mixed methods to gather data from students and educators. The framework took the Kirkpatrick model of evaluation as a theoretical reference.

Results: The framework is feasible and acceptable for use across differing European higher education contexts according to the participants' piloting and consensus. It can be used effectively to evaluate and develop HIS education across European higher education institutions.

Conclusion: We offer a new evaluation framework to capture the impact of HIS education. Implementation of this tool has the potential to facilitate the continuous development of HIS education.

Keywords: Europe; Health personnel; Curriculum; Delivery of health care; Students.

Introduction

Healthcare Improvement Science (HIS) constitutes a body of knowledge but also a strategic dimension aligned to the eHealth Action Plan 2012-2020 as a roadmap for achieving smart and sustainable health care systems across Europe [1]. There is a need to capture the impact and effectiveness of HIS education. According to this, the team led by the Faculty of Health Sciences at the University of Alicante (Spain) as an Improvement Science Training for European Healthcare Workers (ISTEW) European Commission Project partner, began developing an evaluation framework designed to be used by the HEIs [2-4]. With this Framework it is expected to capture the impact of the HIS educational modules that ISTEW Project was delivering. This paper aims at outlining the process of development, the resultant framework and its piloting, which will enable the continuous evaluation within and across all partner countries.

Methods

A qualitative methodology following mixed-methods was used and divided into two steps: 1st step corresponding with the development of the framework and 2nd step regarding its pilot study in different European contexts. The 1st stage comprised two elements, the gathering of a minimum data set (MDS) with the main variables or items

corresponding to the educational module selected and a number of questionnaires designed for different participants at each stage of the learning process (Fig. 1) that were unified by the ISTEW teams from different countries and contexts through a consensus method. Kirkpatrick's four-level Training Evaluation Model was the conceptual reference used to develop the specific methodology [5,6]. Once the HIS Evaluation Framework was agreed by the ISTEW Partnership network composed by 7 teams, a pilot validation (2nd step) using the Case Study Method was undertaken across the 7 different European Educational contexts (Scotland, England, Romania, Slovenia, Italy, Poland and Spain). The pilot validation was conducted and coordinated by the Spanish Team. The total pilot sample were 10 cases. Each case corresponded with one training program regarding HIS in the different contexts and all the selected programs were HIS related or contained elements of HIS. Participants within each case were selected by convenience and contacted through face-to-face meetings or email by each partner team. The pilot sample came from the following areas: Nursing (n=4), Medicine (n=3) and Psychology (n=3). Participants demographics and HIS background were identified through a HIS Front page Fig. 1 that was developed in the 1st step using MDS method (Table 1). All data were collected in classroom in paper format in the beginning and later using Google Forms software at home. A small introduction was given to them explaining all research goals and objectives, also the relation of the interviewers to the project.

Ethical approval: Informed consent was provided by the subjects. This study was approved by the Institutional Review Board of University of Alicante, Spain (IRB Number: 539194-LLP-1-2013-1).

Results

The 7 partner teams made the following decisions based on consensus towards developing the HIS Framework (1st step) and conduct a pilot contents validation (2nd step):

Selecting a conceptual Framework: The Kirkpatrick Model

During the construction of HIS Evaluation Framework, partners agreed to use the four levels described by Kirkpatrick's Model though adding a Level 5 to evaluate "Return on Investment". Kirkpatrick's assumption that level four data are the most useful, without Level 5 it ignores the potential differences about training and training outcomes that may exist among key stakeholders groups (e.g. trainees, managers, trainers) in organizations. Moreover, Level 5 contributes to link the learning intervention with the outcome in context, in relation with the

cost-efficiency potentially achieved due to the HIS training programmes undertaken by students.

Developing a Minimum Data Set

According to some authors [7], the original Kirkpatrick model presents an oversimplified view of training effectiveness, not considering individual or contextual influences in the evaluation of training. Therefore, characteristics of the organization, work environment and characteristics of the individual trainee are crucial input factors. To fill this gap, a Minimum Data Set (MDS) was developed to capture a set of information with uniform categories concerning a specific dimension [8]. The first page of each questionnaire was designed to capture the characteristics of the organization, environment and student. It tries to capture the context, and was included to overcome an identified limitation of the Kirkpatrick model [9].

Developing the Questionnaires

The HIS Evaluation Framework was designed to be an anonymous self-completion questionnaire with its corresponding Informed Consent Page in the beginning. Each questionnaire had open and closed questions and Likert scales. Different questionnaires were developed to capture each level of the learning process Each respondent also has to create its own code, to be used in all levels. This resulted in the design of five different questionnaires for each key stakeholders' groups. Overall, the framework was designed to capture the impact of the different stages of the HIS learning process from Level 1(Reaction) to Level 5 (Return on Investment).

The framework prospectively captures the outcomes and impacts of HIS education on learners, educators and healthcare professionals in practice settings such as mentors or managers of the learners. Fig. 1 illustrated how the questionnaires were matched to participants.

Developing the Evaluation Framework and Piloting Process

Once having used the conceptual framework selected as a reference and after the whole methodological process explained before, the ISTEW Team arrived to a Consensus in terms of the Levels to evaluate HIS learning and the questionnaires designed and piloted to do so, what constitutes the HIS Framework itself. Partner teams completed a pilot content validation of the agreed HIS Evaluation Framework. Raw data were available from Supplement 1. The piloting process tested the content, understanding and the usability of both the MDS and the various questionnaires. The piloting process was iterative and successive drafts were produced and refined over time resulting in a version acceptable, feasible and suitable for use in all seven countries. After each version all partners

share improvement ideas, also students' comments were taken into account. Some parts of the questionnaires developed along the framework construction can be seen in Figs. 2 and 3. The piloting revealed that the more succinct questions and questionnaires were, the easier it was for participants from seven different countries and educational contexts to complete. Over time the questions became shorter and the questionnaires less complex with more signposting and explanatory text to aid fuller completion.

Discussion

The framework composed by the HIS levels and the HIS Evaluation Framework questionnaires per level provides a standardized design that overcomes some of the limitations discussed by other authors about the design and delivery of the interventions through a multicultural European piloting, taking into account different educational contexts. These authors suggest a combination of qualitative and quantitative methods to permit the determination of how context level factors might modify intervention effectiveness [10]. The methods used in the development of the HIS Evaluation Framework included participants' qualitative and quantitative data obtained through the MDS and different questionnaires as well as the seven ISTEW partner teams discussions and inter-organizational networks. The importance of measuring the effectiveness of training due to the current challenging times and how a mixed methods approach looking at both qualitative and quantitative data, obtained through a MDS and a modified Kirkpatrick evaluation has enable us to do this across differing contexts.

Although there is no doubt that Kirkpatrick's model has made valuable contributions to training evaluation thinking and practice, the ISTEW Partnership were aware of the limitations of such a model that have implications for the ability of training evaluators to deliver benefits and further the interests of organizational clients. These limitations also highlighted by some authors [9] included "the incompleteness of the model, the assumption of causality, and the assumption of increasing importance of information as the levels of outcomes are ascended". The ISTEW partnership aimed to adapt and apply the Kirkpatrick model further so that it could overcome the identified limitations.

Some of the limitations highlighted by other authors and associated with the four different Kirkpatrick's stages [11] were also discussed by the ISTEW partners during the piloting process. Consequently, partners designed individual questionnaires for different participants to enable them to answer anonymously with the aim of reducing reticence or concerns about its participation. This would give the opportunity for the evaluator to provide additional

support for learners where they felt that their objectives were not met.

Kirkpatrick [9] questioned how evaluators have under control other factors that may affect the impact of the training intervention, in other words, how can we be sure that the module selected is precisely the training intervention needed. Following Øvretveit recommendation [12] to try to overcome this by using a tool to measure ability provided by the modules, before and after the event, the HIS Evaluation Framework included mixed methods, quantitative and qualitative ones.

An opportunity for future learning would be to test the tool itself on the new HIS modules that were developed due to a delay in the integration of the HIS modules into educational practice. Instead, the pilot sample involved programs or modules already in use that contained elements of HIS. A further limitation is that the Evaluation Framework and the questionnaires developed were in English. Thus the pilot sample relied on participants that could read and understand English. For the most part the pilot sample came from areas of Nursing (n=4), Medicine (n=3) and Psychology (n=3). It would be useful for the questionnaire to be tested amongst a wider range of professional groups. Moreover, with the MDS in the Front Page it was intended to capture the context and cultural data, however, it may be assumed that a valuable amount of information associated with the qualitative data is still missing [13]. This aspect is being considered for future versions of the tool.

Finally, it was not possible to pilot level 5, return on the HIS education investment, due to the time limitations of the project and the fact that the pilot modules were not fully developed at the time of the pilot.

The framework was implemented at the 1st and 2nd Summer Program on Healthcare Improvement Science course held by the University of Alicante in collaboration with the University of the West of Scotland in July 2016 and July 2017. This course, as specific education in HIS was used as part of the Evaluation Framework piloting. Its results will be used prospectively to keep improving the Framework itself after collecting enough data along several editions with students from different fields and cultures.

The evaluation framework has the potential to effectively identify strengths, weaknesses and gaps in the HIS education across Europe as well as Return on Investment.

Investing in a better educated professional staff regarding a Healthcare Improvement Science scope could potentially improve the quality of patient care by building bridges between theory and practice and contributing to generate an Improvement Culture in Healthcare contexts.

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Data curation: MC, ML.

Methodology: ML, KR, RM.

Project administration: ML.

Visualization: MC.

Writing – original draft: ML, MC.

Writing – review & editing: ML, MC, RM, KR.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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Supplementary materials

Supplement 1. Data file is available from

Supplement 2. Audio recording of the abstract

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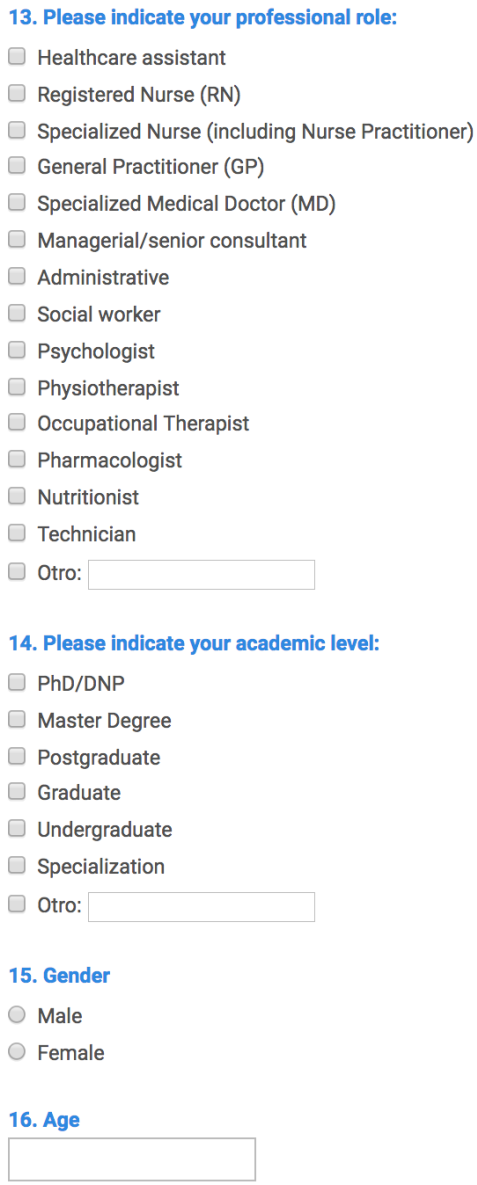
Legends for figures

Fig. 1. Example of the Minimum Data Set developed.



13. Please indicate your professional role:

- ☐ Healthcare assistant
- ☐ Registered Nurse (RN)
- ☐ Specialized Nurse (including Nurse Practitioner)
- ☐ General Practitioner (GP)
- ☐ Specialized Medical Doctor (MD)
- ☐ Managerial/senior consultant
- ☐ Administrative
- ☐ Social worker
- ☐ Psychologist
- ☐ Physiotherapist
- ☐ Occupational Therapist
- ☐ Pharmacologist
- ☐ Nutritionist
- ☐ Technician
- ☐ Otro:

14. Please indicate your academic level:

- ☐ PhD/DNP
- ☐ Master Degree
- ☐ Postgraduate
- ☐ Graduate
- ☐ Undergraduate
- ☐ Specialization
- ☐ Otro:

15. Gender

- ○ Male
- ○ Female

16. Age

Fig. 2. Healthcare Improvement Science Evaluation Framework development.

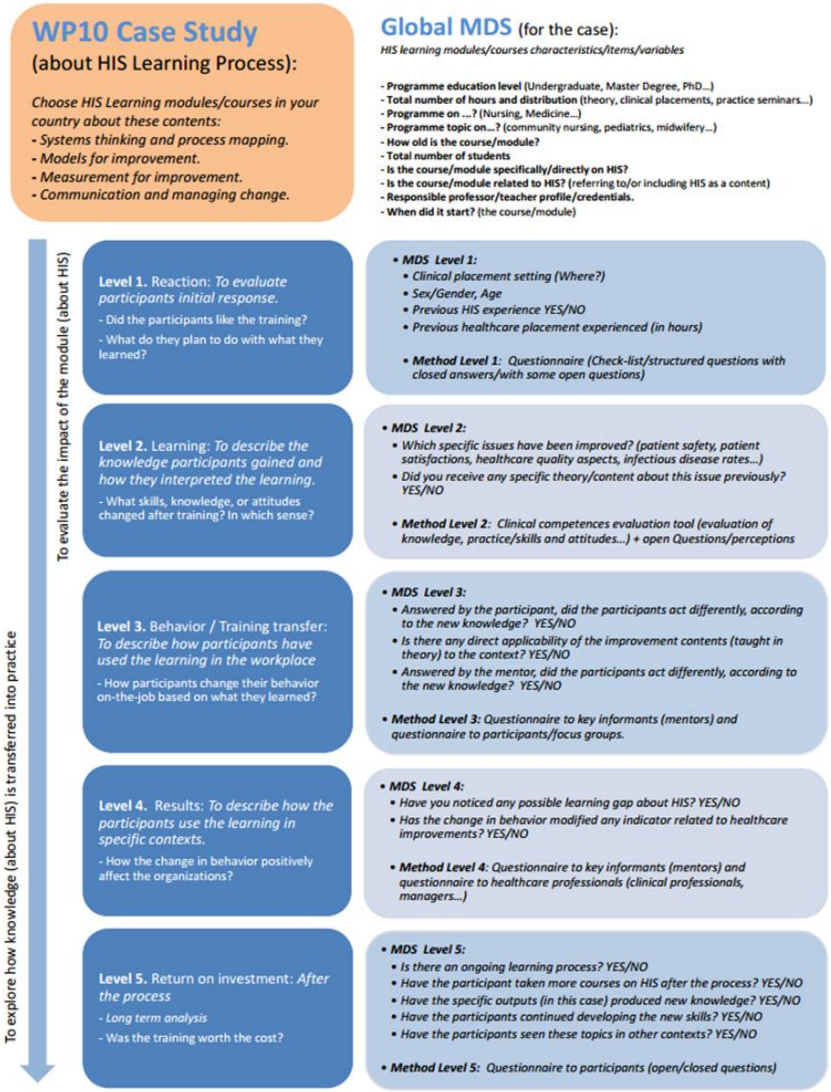


Fig. 3: Examples of Online Healthcare Improvement Science Learning Evaluation Framework Level 1 and Level 5.

Table 1. Healthcare Improvement Science Evaluation Framework Levels according to participant's role.

	Student	Educator	Manager/Tutor	Manager/Professional
Level 1. Reaction	✓	✓		
Level 2. Learning	✓	✓		
Level 3. Behaviour/Training transfer	✓	✓		
Level 4. Results	✓	✓	✓	✓
Level 5. Return on inestment	✓	✓	✓	✓